

Metal Industry Indicators

Indicators of Domestic Primary Metals, Steel, Aluminum, and Copper Activity

November 1999

The primary metals leading index decreased in October and September, raising some questions about prospects for further growth in domestic primary metals activity in the coming months. The metals price leading index, which has declined in the most recent two months for which it is available, may be giving a more pessimistic outlook for metal prices than is warranted.

The **primary metals leading index** dropped 1.2% in October to 127.5 from a revised 129.0 in September. The index's 6-month smoothed growth rate, a compound annual rate that measures the near-term trend, also slowed, dropping to 0.1% from a revised 2.8% in September. A growth rate above +1.0% is usually a sign of an upward near-term trend for future metals activity, while a growth rate below -1.0% indicates a downward near-term trend.

The growth rate of the primary metals leading index has slowed markedly in the past two months and has been on a downward trend since last June. The index appears to be signaling slower near-term growth for domestic primary metals activity.

As has normally been the case, only four of the index's eight components were available in time for the October index calculation. All four of those components moved lower, with the length of the average workweek in primary metals establishments, the S&P stock price index for diversified machinery companies, and the Purchasing Managers' Index accounting for nearly all of the decrease in the leading index.

We have become concerned about the size of revisions to our preliminary leading index in recent months. Last month for example, the September index, with only four of its eight components available, increased 1.3%. This month, with all eight components included, the September index fell 0.6%. Approximately two-thirds of the total revision was caused by the inclusion of data for the other four components, all of which decreased in September. Most of the remaining revision resulted from reweighting after all eight components were included in the index. We are investigating the possibility of releasing the index several days later to include additional indicators to minimize this volatility.

The **steel leading index** plunged 1.9% in September, the latest month for which it is available, falling to 110.8 from a revised 113.0 in August. Likewise, the index's 6-month smoothed growth rate slowed sharply to 0.3% from a revised 4.8% in August. Seven of the index's nine components declined in September, with the largest contribution to the net decrease in the index

coming from inflation-adjusted shipments of household appliances, which registered their largest 1-month drop since October 1988. Five other components also made sizable negative contributions. Although the leading index's growth rate was quite strong from February to August of this year, it has been trending downward since June, and could be pointing to slower growth for steel activity in the months ahead.

The **aluminum mill products leading index** advanced 1.0% in September, up to 159.2 from a revised 157.7 in August, while its 6-month smoothed growth rate accelerated to 3.9% from a revised 2.4% in August. Although three of the index's seven components moved down sharply in September, strong gains among the other four components more than offset the declines. The 6-month smoothed growth rate of the aluminum mill products leading index remains in the range that signals near-term growth in industry activity.

The **primary aluminum leading index** jumped 1.9% in September to 93.3 from a revised 91.6 in August, and the index's 6-month smoothed growth rate climbed to 8.3% from a revised 5.6% in August. One component, the length of the average workweek in primary aluminum establishments, accounted for over three-fourths of the net increase in the leading index. Since last April, the growth rate of the primary aluminum leading index has been quite strong, pointing to increased demand for primary aluminum in the near future. (Tables and charts for the primary aluminum indexes are in a separate file.)

The **copper leading index** posted a small increase in September, edging up to 132.6 from 132.5 in August, and the index's 6-month smoothed growth rate slowed to 3.5% from 3.9% in August. Only two of the index's seven components declined in September. However, the largest drop in housing permits since January 1995 offset most of the gains made by other components. Although the growth rate of the copper leading index is still well above +1.0%, high inventory levels, industry consolidation, and imports could hold down growth in U.S. copper industry activity.

Latest Metals Price Indicators Give Mixed Signals

The **metals price leading index** fell 1.2% in September, the latest month for which it is available, to 96.5 from a revised 97.7 in August. The index's 6-month smoothed growth slumped to -2.4%, its lowest growth rate since September 1998. Two of the index's four components, the growth rates of the inflation-adjusted value of U.S. M2 money supply and building permits for new U.S. housing were responsible for most of the net decline in the leading index. A third component, the growth rate of the OECD total leading index also moved lower, down to 5.2% in September from 5.6% in August, marking that component's first decline in 12 months. The fourth component, the growth rate of the inflation-adjusted value of new orders for U.S. nonferrous and other primary metals, was up slightly.

The metals price leading index has weakened in recent months, primarily because of falling growth in two indicators, the U.S. M2 money supply and building permits issued for new U.S. housing. However, declining inventory growth, a weaker U.S. dollar, and the growth in industrial activity anticipated by the

OECD leading index suggest the possibility of further increases in some metal prices in the near future. Price growth for some metals, though, could stall because inventory levels for some metal products remain high.

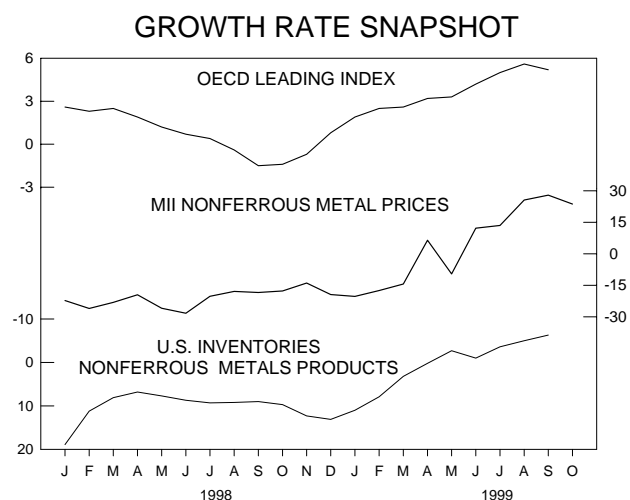


Table 1.
Leading Index of Metal Prices and Growth Rates of the Nonferrous Metals Price Index, Inventories of Nonferrous Metal Products, and Selected Metal Prices

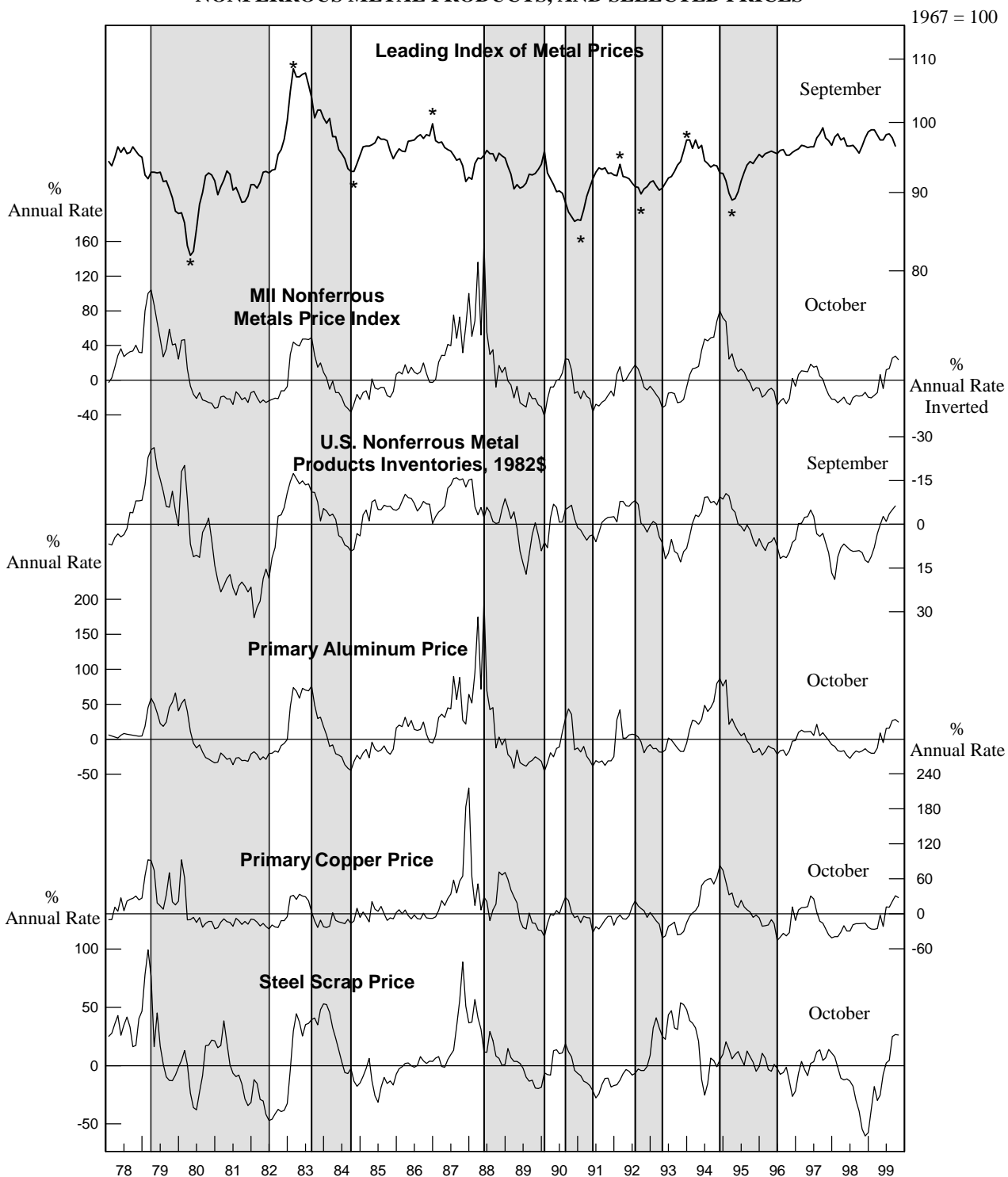
Six-Month Smoothed Growth Rates						
	Leading Index of Metal Prices (1967=100)	MI Nonferrous Metals Price Index	U.S. Nonferrous Metal Products Inventories (1982\$)	Primary Aluminum	Primary Copper	Steel Scrap
1998						
September	95.5r	-18.4	9.0	-18.6	-16.9	-39.0
October	96.5r	-17.7	9.7	-16.8	-16.5	-54.5
November	97.7r	-13.9	12.3	-13.5	-15.9	-60.2
December	98.6r	-19.4	13.1	-18.0	-23.0	-57.4
1999						
January	98.9r	-20.3	11.0	-20.2	-26.0	-37.5
February	98.9r	-17.5	7.9	-20.2	-26.4	-17.8
March	98.1	-14.4	3.2	-12.6	-25.1	-29.8
April	97.4	6.5	0.2	8.8	-1.7	-25.3
May	97.4r	-9.6	-2.7r	-4.9	-21.7	-7.6
June	98.2r	12.2	-1.0	15.3	11.7	2.2
July	98.3r	13.5	-3.6r	15.8	11.4	4.4
August	97.7r	25.6	-5.0r	26.7	21.7	24.9
September	96.5	27.9	-6.3	28.0	31.0	26.6
October	NA	23.7	NA	24.4	28.0	26.2

NA: Not available r: Revised

Note: The components of the Leading Index of Metal Prices are the 6-month smoothed growth rates of the following: 1, the deflated value of new orders for nonferrous metals; 2, the OECD leading index, total; 3, the index of new private housing units authorized; and 4, the deflated value of U.S. M2 money supply. The Metal Industry Indicators (MI) Nonferrous Metals Price Index measures changes in end-of-the-month prices for primary aluminum, copper, lead, and zinc traded on the London Metal Exchange (LME). The steel scrap price used is the price of No. 1 heavy melting. Inventories consist of the deflated value of finished goods, work in progress, and raw materials for U.S.-produced nonferrous metals and nonferrous metal products. Six-month smoothed growth rates are based on the ratio of the current month's index or price to its average over the preceding 12 months, expressed at a compound annual rate.

Sources: U.S. Geological Survey (USGS); American Metal Market (AMM); the London Metal Exchange (LME); the Bureau of the Census; and the Organization for Economic Cooperation and Development (OECD).

CHART 1.
LEADING INDEX OF METAL PRICES AND GROWTH RATES
OF NONFERROUS METALS PRICE INDEX, INVENTORIES OF
NONFERROUS METAL PRODUCTS, AND SELECTED PRICES



Shaded areas are downturns in the nonferrous metals price index growth rate. Asterisks (*) are peaks and troughs in the economic activity reflected by the leading index of metal prices. Scale for nonferrous metal products inventories is inverted.

Table 2.
The Primary Metals Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
1998				
November	126.1	-2.2	109.6	-3.4
December	125.1	-3.2	109.6	-3.0
1999				
January	126.0r	-1.5	110.1	-1.8
February	126.5	-0.5	109.8	-1.9
March	126.9	0.5r	111.1	0.6
April	127.7r	1.9r	110.8	0.2
May	129.0	4.1r	111.3	1.4
June	129.6	5.0r	111.9r	2.3r
July	129.5	4.4	113.0	4.2
August	129.8r	4.5r	113.4r	4.3r
September	129.0r	2.8r	113.2	3.8
October	127.5	0.1	NA	NA

NA: Not available r: Revised

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

Table 3.
The Contribution of Each Primary Metals Index Component to the Percent Change in the Index from the Previous Month

Leading Index	September	October
1. Average weekly hours, primary metals (SIC 33)	0.2r	-0.4
2. S&P stock price index, machinery, diversified	-0.2r	-0.4
3. Ratio of price to unit labor cost (SIC 33)	-0.4	NA
4. JOC metals price index growth rate	0.1r	-0.1
5. New orders, primary metals, (SIC 33) 1982\$	-0.1	NA
6. Index of new private housing units authorized by permit	-0.4	NA
7. Growth rate of U.S. M2 money supply, 1992\$	-0.4	NA
8. Purchasing Managers' Index	0.4r	-0.3
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	-0.8r	-1.2
Coincident Index	August	September
1. Industrial production index, primary metals (SIC 33)	0.3	-0.2
2. Total employee hours, primary metals (SIC 33)	-0.3	0.0
3. Value of shipments, primary metals, (SIC 33) 1982\$	0.2r	0.0
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	0.3r	-0.1

Sources: Leading: 1, Bureau of Labor Statistics; 2, Standard & Poor's; 3, Center for International Business Cycle Research, Bureau of Labor Statistics, and Federal Reserve Board; 4, Journal of Commerce; 5, Bureau of the Census and U.S. Geological Survey; 6, Bureau of the Census and U.S. Geological Survey; 7, Federal Reserve Board, Conference Board, and U.S. Geological Survey; and 8, National Association of Purchasing Management. Coincident: 1, Federal Reserve Board; 2, Bureau of Labor Statistics and U.S. Geological Survey; 3, Bureau of the Census and U.S. Geological Survey. All series are seasonally adjusted, except 2, 3, and 4 of the leading index.

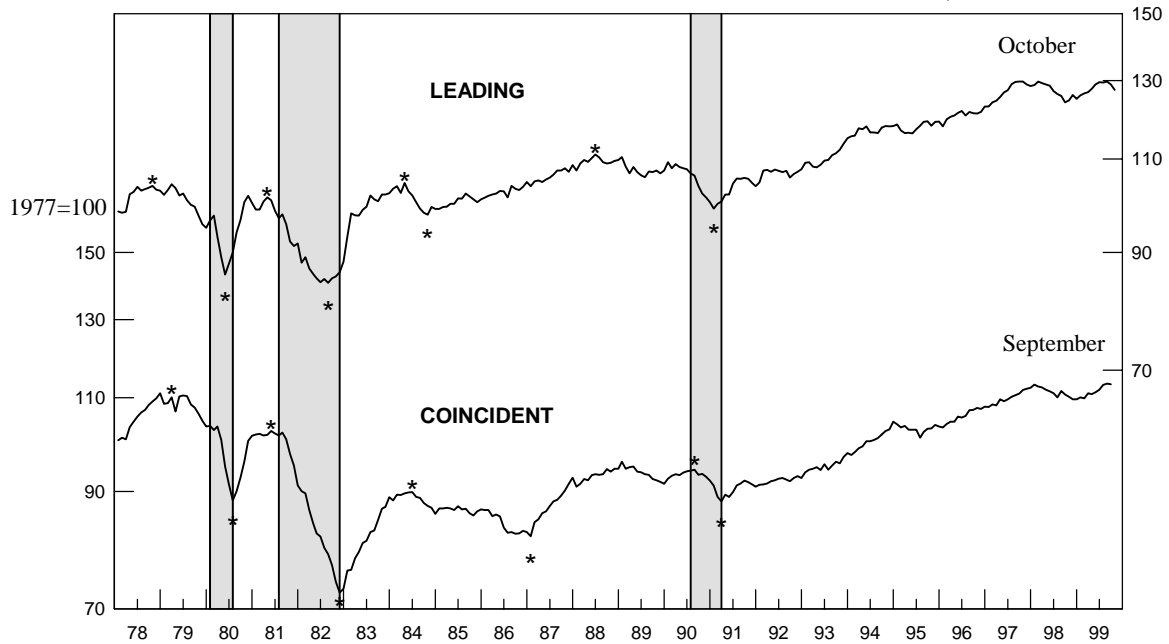
NA: Not available r: Revised

Note: A component's contribution, shown in Tables 3, 5, 7, and 9, measures its effect, in percentage points, on the percent change in the index. Each month, the sum of the contributions plus the trend adjustment equals (except for rounding differences) the index's percent change from the previous month.

CHART 2.

PRIMARY METALS: LEADING AND COINCIDENT INDEXES, 1978-99

1977=100

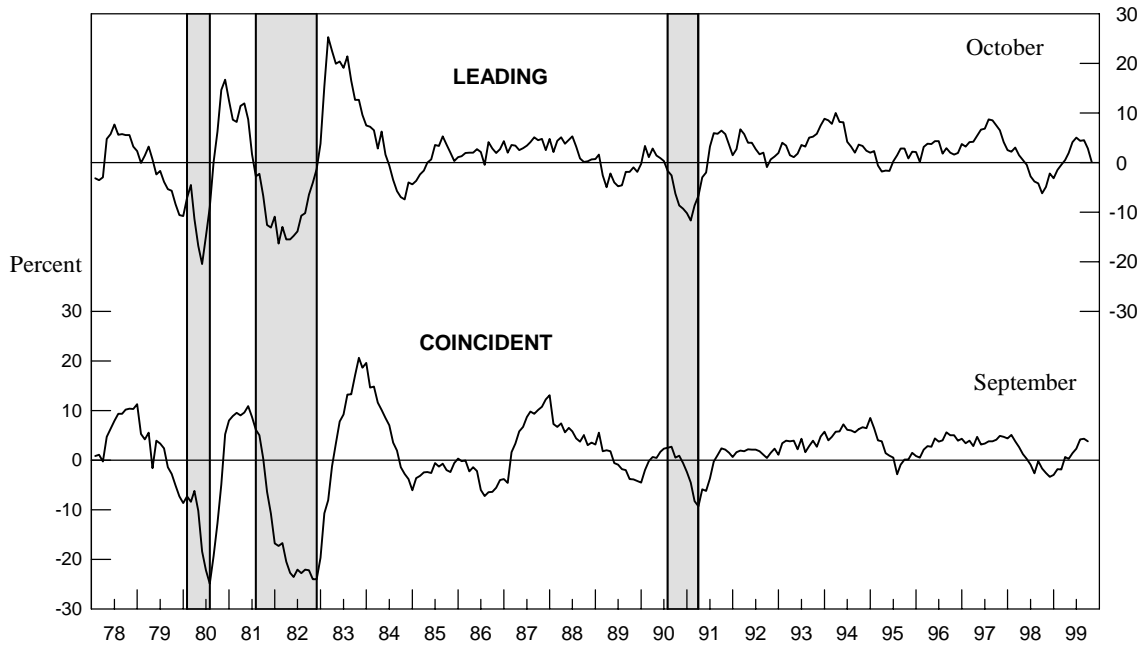


Shaded areas are business cycle recessions. Asterisks (*) signify peaks (the end of an expansion) and troughs (the end of a downturn) in the economic activity reflected by the indexes.

CHART 3.

PRIMARY METALS: LEADING AND COINCIDENT GROWTH RATES, 1978-99

Percent



Shaded areas are business cycle recessions.

The growth rates are expressed as compound annual rates based on the ratio of the current month's index to its average level during the preceding 12 months.

Table 4.
The Steel Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
1998				
November	108.8r	-2.0	96.5	-6.0
December	108.2r	-2.6	96.7	-5.2
1999				
January	109.9r	0.6	97.2	-3.7
February	111.8	4.0r	97.3	-2.8
March	110.5	1.8r	98.4	-0.2
April	111.5	3.7r	98.7	0.7
May	112.6	5.5	99.2r	2.0
June	113.0r	6.0r	99.5	2.7r
July	112.5	4.6	100.4	4.2
August	113.0r	4.8r	101.3r	5.8r
September	110.8	0.3	100.7	4.4

r: Revised

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

Table 5.
The Contribution of Each Steel Index Component to the Percent Change in the Index from the Previous Month

Leading Index	August	September
1. Average weekly hours, blast furnaces and basic steel products (SIC 331)	-0.1	-0.3
2. New orders, steel works, blast furnaces, and rolling and finishing mills, 1982\$, (SIC 331)	0.1	-0.1
3. Shipments of household appliances, 1982\$	0.0r	-0.7
4. S&P stock price index, steel companies	-0.2	-0.4
5. Industrial production index for automotive products	0.5r	-0.3
6. Growth rate of the price of steel scrap (#1 heavy melting, \$/ton)	0.4	0.1
7. Index of new private housing units authorized by permit	-0.1	-0.4
8. Growth rate of U.S. M2 money supply, 1992\$	-0.2r	-0.4
9. Purchasing Managers' Index	0.1	0.4
Trend adjustment	0.0	0.0
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Percent change (except for rounding differences)	0.5r	-2.1
Coincident Index		
1. Industrial production index, basic steel and mill products (SIC 331)	0.4r	-0.2
2. Value of shipments, steel works, blast furnaces, and rolling and finishing mills (SIC 331), 1982\$	0.3	0.0
3. Total employee hours, blast furnaces and basic steel products (SIC 331)	0.1r	-0.4
Trend adjustment	0.1	0.1
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Percent change (except for rounding differences)	0.9r	-0.5

Sources: Leading: 1, Bureau of Labor Statistics; 2, Bureau of the Census and U.S. Geological Survey; 3, Bureau of the Census and U.S. Geological Survey; 4, Standard & Poor's; 5, Federal Reserve Board; 6, Journal of Commerce and U.S. Geological Survey; 7, Bureau of the Census and U.S. Geological Survey; 8, Federal Reserve Board, Conference Board, and U.S. Geological Survey; and 9, National Association of Purchasing Management. Coincident: 1, Federal Reserve Board; 2, Bureau of the Census and U.S. Geological Survey; 3, Bureau of Labor Statistics and U.S. Geological Survey. All series are seasonally adjusted, except 4 and 6 of the leading index.

r: Revised

CHART 4.
STEEL: LEADING AND COINCIDENT INDEXES, 1978-99

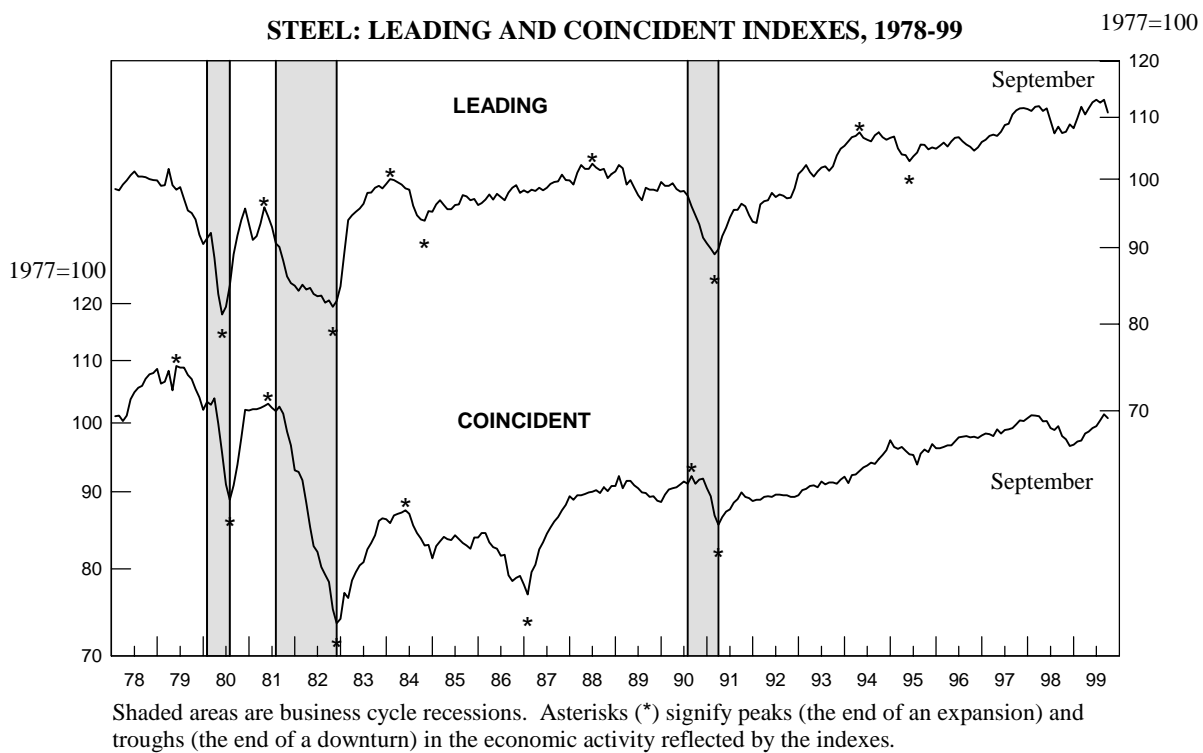


CHART 5.
STEEL: LEADING AND COINCIDENT GROWTH RATES, 1978-99

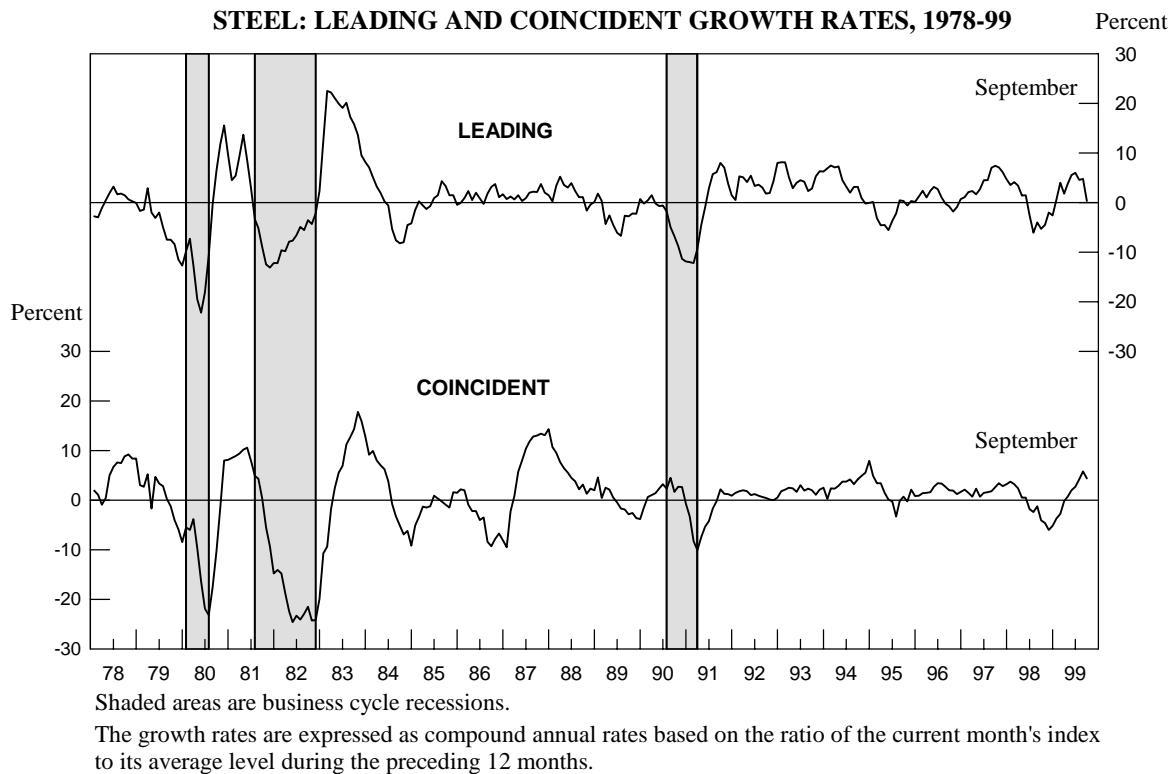


Table 6.
The Aluminum Mill Products Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
1998				
October	154.2r	1.5r	137.9	-4.0
November	152.5	-0.7	136.7	-5.1
December	154.7	1.8	135.5	-6.1
1999				
January	155.2r	2.3	136.9	-3.8
February	154.7	1.4	136.8	-3.3
March	156.2r	3.2r	139.7	1.1
April	156.1r	2.9r	139.6	0.9
May	157.7	4.5r	140.4	2.0
June	159.1r	5.6r	141.6	3.6r
July	158.2r	3.7	140.9r	2.4r
August	157.7r	2.4r	142.1r	4.2r
September	159.2	3.9	143.5	5.9

r: Revised

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

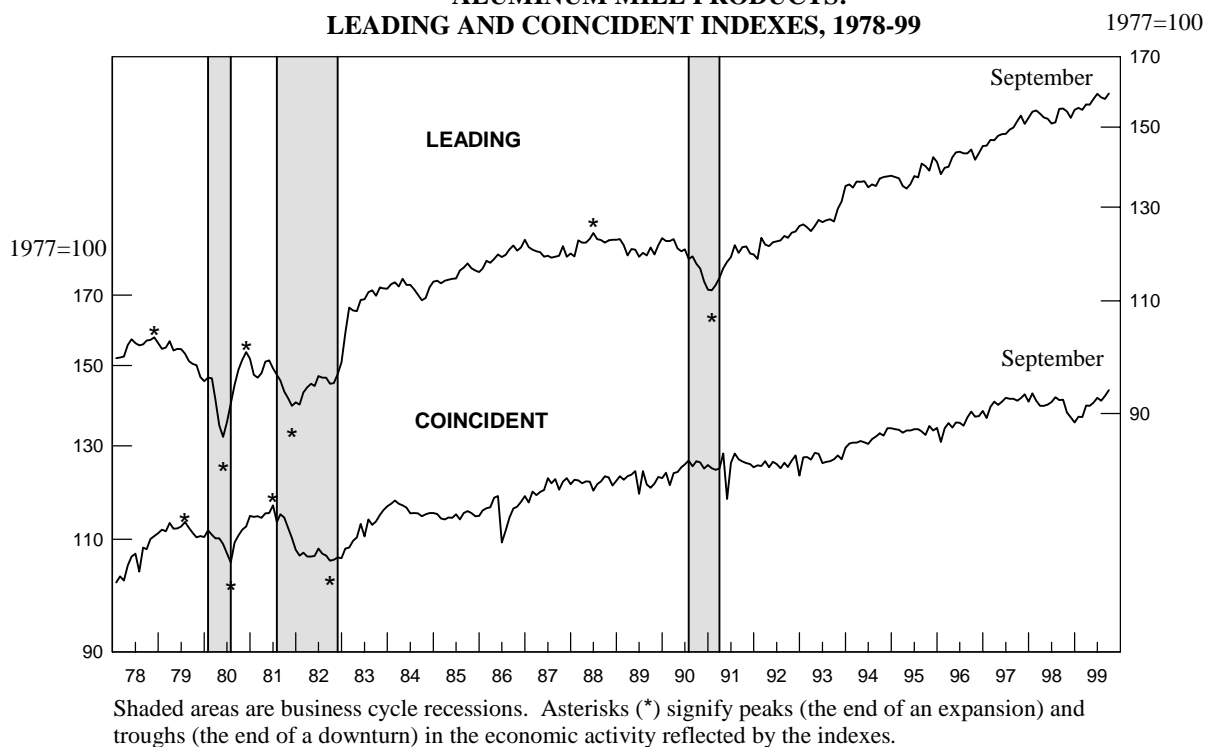
Table 7.
The Contribution of Each Aluminum Mill Products Index Component to the Percent Change in the Index from the Previous Month

Leading Index	August	September
1. Average weekly hours, aluminum sheet, plate, and foil (SIC 3353)	-0.4r	0.8
2. Index of new private housing units authorized by permit	-0.1	-0.4
3. Industrial production index for automotive products	0.6r	-0.4
4. Construction contracts, commercial and industrial (square feet)	-0.1	0.2
5. Net new orders for aluminum mill products (pounds)	-0.3	0.6
6. Growth rate of U.S. M2 money supply, 1992\$	-0.3	-0.5
7. Purchasing Managers' Index	0.1	0.5
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	-0.4r	0.9
Coincident Index		
1. Industrial production index, aluminum sheet, plate, and foil (SIC 3353)	0.2r	-0.1
2. Total employee hours, aluminum sheet, plate, and foil (SIC 3353)	0.5	0.9
Trend adjustment	0.2	0.2
Percent change (except for rounding differences)	0.9r	1.0

Sources: Leading: 1, Bureau of Labor Statistics; 2, Bureau of the Census and U.S. Geological Survey; 3, Federal Reserve Board; 4, F.W. Dodge, Division of McGraw-Hill Information Systems Company; 5, The Aluminum Association, Inc. and U.S. Geological Survey; 6, Federal Reserve Board, Conference Board, and U.S. Geological Survey; 7, National Association of Purchasing Management. Coincident: 1, Federal Reserve Board; 2, Bureau of Labor Statistics and U.S. Geological Survey. All series are seasonally adjusted.

r: Revised

**CHART 6.
ALUMINUM MILL PRODUCTS:
LEADING AND COINCIDENT INDEXES, 1978-99**



**CHART 7.
ALUMINUM MILL PRODUCTS:
LEADING AND COINCIDENT GROWTH RATES, 1978-99**

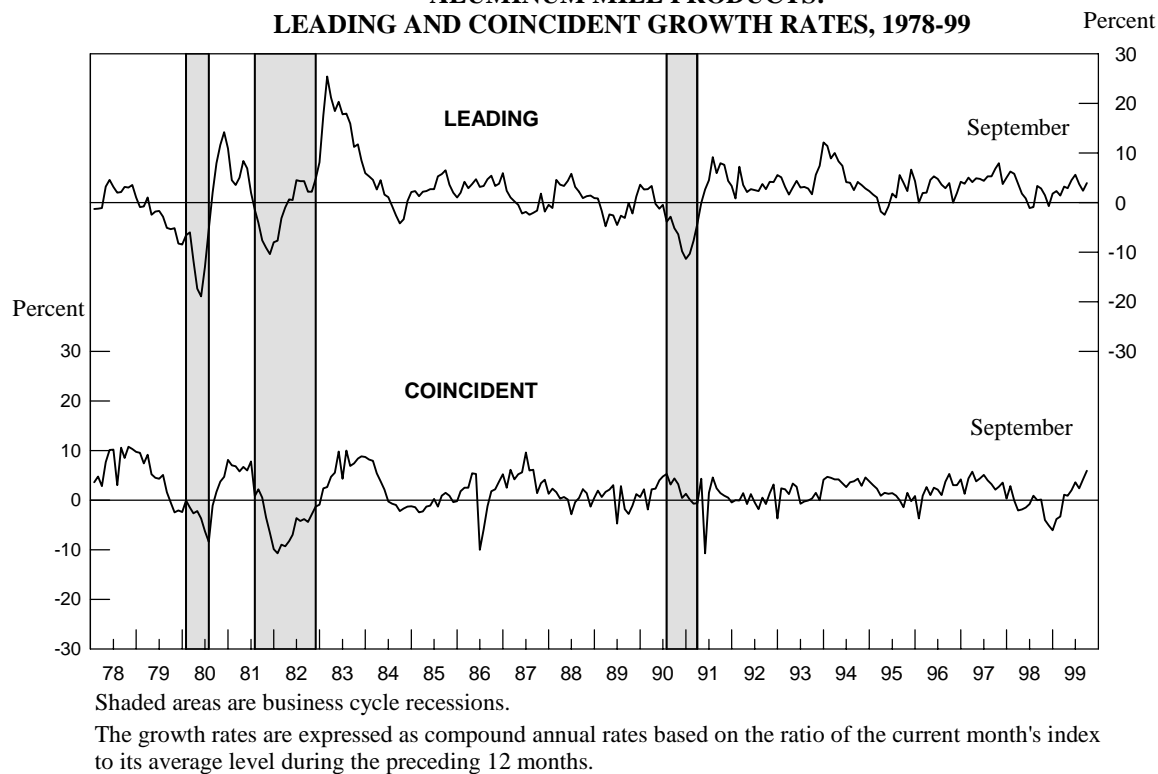


Table 8.
The Copper Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
1998				
October	126.9	-0.4	125.3	0.8
November	130.3	4.6	126.0	1.6
December	130.4	4.2	125.7	1.0
1999				
January	130.8	4.3	123.7	-2.0
February	129.2	1.5	123.5	-1.9
March	128.5	0.2	124.1	-1.0
April	130.5	2.8	124.1	-0.8
May	130.4	2.3	122.4	-3.2
June	132.3	4.7	121.7	-4.2
July	133.0	5.2	122.3	-2.9
August	132.5	3.9	122.2r	-2.8r
September	132.6	3.5	121.5	-3.5

r: Revised

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

Table 9.
The Contribution of Each Copper Index Component to the Percent Change in the Index from the Previous Month

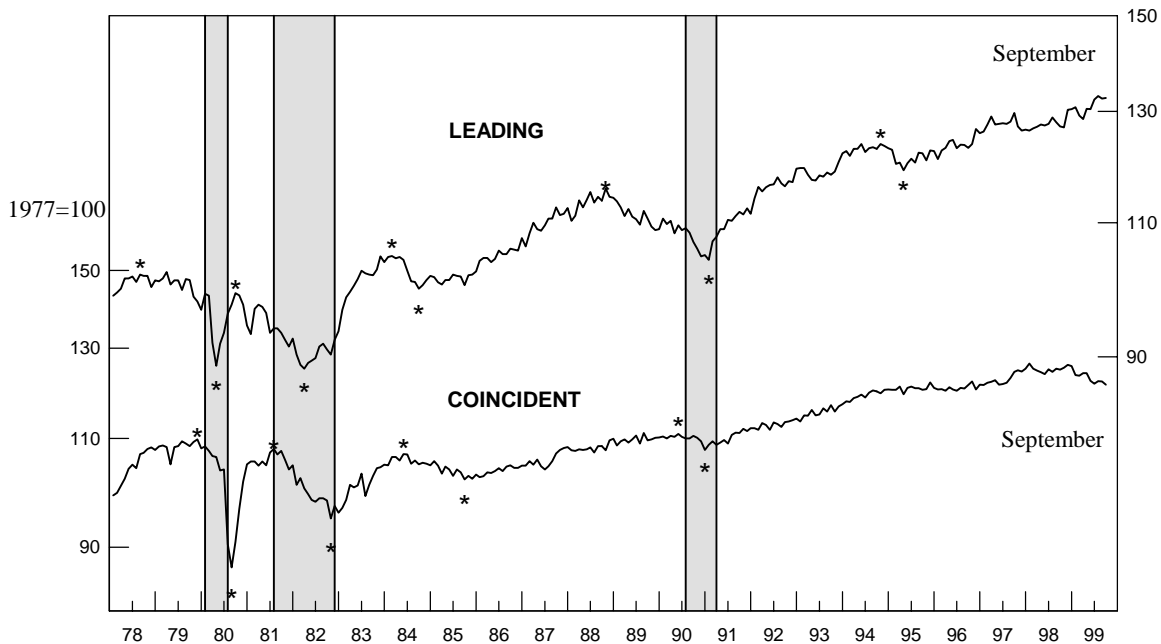
Leading Index	August	September
1. Average weekly overtime hours, rolling, drawing, and extruding of copper (SIC 3351)	0.1	0.1
2. New orders, nonferrous and other primary metals, 1982\$	-0.3r	0.1
3. S&P stock price index, building materials companies	-0.4	0.2
4. Ratio of shipments to inventories, electronic and other electrical equipment (SIC 36)	0.0	0.0
5. LME spot price of primary copper	0.2	0.2
6. Index of new private housing units authorized by permit	-0.1	-0.4
7. Spread between the U.S. 10-year Treasury Note and the Federal Funds rate	0.1	-0.1
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	-0.4r	0.1
Coincident Index		
1. Industrial production index, primary smelting and refining of copper (SIC 3331)	0.0r	0.1
2. Total employee hours, rolling, drawing, and extruding of copper (SIC 3351)	0.6r	-1.2
3. Copper refiners' shipments (short tons)	-0.8	0.4
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	-0.1r	-0.6

Sources: Leading: 1, Bureau of Labor Statistics; 2, Bureau of the Census and U.S. Geological Survey; 3, Standard & Poor's; 4, Bureau of the Census and U.S. Geological Survey; 5, London Metal Exchange; 6, Bureau of the Census and U.S. Geological Survey; 7, Federal Reserve Board and U.S. Geological Survey. Coincident: 1, Federal Reserve Board; 2, Bureau of Labor Statistics; 3, American Bureau of Metal Statistics, Inc. and U.S. Geological Survey. All series are seasonally adjusted, except 3, 5, and 7 of the leading index.

r: Revised

CHART 8.
COPPER: LEADING AND COINCIDENT INDEXES, 1978-99

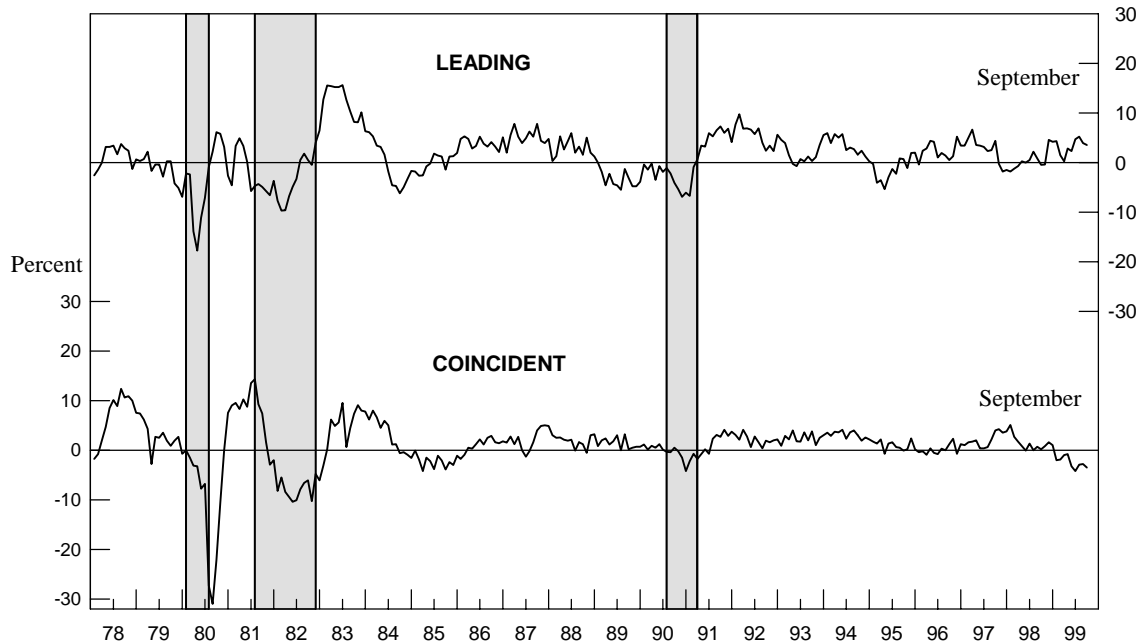
1977=100



Shaded areas are business cycle recessions. Asterisks (*) signify peaks (the end of an expansion) and troughs (the end of a downturn) in the economic activity reflected by the indexes.

CHART 9.
COPPER: LEADING AND COINCIDENT GROWTH RATES, 1978-99

Percent



Shaded areas are business cycle recessions.

The growth rates are expressed as compound annual rates based on the ratio of the current month's index to its average level during the preceding 12 months.

Explanation

Each month, the U.S. Geological Survey tracks the effects of the business cycle on five U.S. metal industries by calculating and publishing composite indexes of leading and coincident indicators. Wesley Mitchell and Arthur Burns originated the cyclical-indicators approach for the economy as a whole at the National Bureau of Economic Research in the mid-1930's. Over subsequent decades this approach was developed and refined, mostly at the National Bureau, under the leadership of Geoffrey H. Moore.¹

A business cycle can briefly be described as growth in the level of economic activity followed by a decline succeeded by further growth. These alternating periods of growth and decline do not occur at regular intervals. Composite indexes, however, can help determine when highs and lows in the cycle might occur. A composite index combines cyclical indicators of diverse economic activity into one index, giving decision makers and economists a single measure of how changes in the business cycle are affecting economic activity.

The indicators in the metal industry leading indexes historically give signals several months in advance of major changes in a coincident index, a measure of current metal industry activity. Indicators that make up the leading indexes are, for the most part, measures of anticipations or new commitments to various economic activities that can affect the metal industries in the months ahead.

Composite coincident indexes for the metal industries consist of indicators for production, shipments, and total employee hours worked. As such, the coincident indexes can be regarded as measures of the economic health of the metal industries.

Four of the metal industry coincident indexes, those for primary metals, steel, primary aluminum, and aluminum mill products, reflect their classifications in the U.S. Standard Industrial Classification (SIC). The SIC is the main classification used by the United States government and industry in collecting and tabulating economic statistics. The coincident index for copper is a blend of two different copper industries, primary smelting and refining of copper and rolling, drawing, and extruding of copper.

Of the five metal industries, primary metals is the broadest, consisting of twenty-six different metal processing industries. The steel, aluminum, and copper industries are parts of the primary metals industry.

The metal industry leading indexes turn before their respective coincident indexes an average of 9 months for primary metals and 8 months for steel and copper. The average lead time for the primary aluminum leading index is 6 to 8 months, and the

¹**Business Cycle Indicators, A monthly report from The Conference Board** (March 1996).

average lead time for the aluminum mill products leading index is 6 months.

The leading index of metal prices, also published in the *Metal Industry Indicators*, is designed to signal changes in a composite index of prices for primary aluminum, copper, lead, and zinc traded on the London Metal Exchange. On average, this leading index indicates significant changes in price growth about 7 months in advance.

The growth rate used in the *Metal Industry Indicators* is a 6-month smoothed growth rate at a compound annual rate, calculated from a moving average. Moving averages smooth fluctuations in data over time so that trends can be observed. The 6-month smoothed growth rate is based upon the ratio of the latest monthly value to the preceding 12-month moving average.

$$\left[\left(\frac{\text{current value}}{\text{preceding 12-month moving average}} \right)^{\frac{12}{6.5}} - 1.0 \right] * 100$$

Because the interval between midpoints of the current month and the preceding 12 months is 6.5 months, the ratio is raised to the 12/6.5 power to derive a compound annual rate.

The growth rates measure the near-term industry trends. They, along with other information about the metal industries and the world economy, are the main tools used to determine the outlook of the industries. A 6-month smoothed growth rate above +1.0% usually means increasing growth; a rate below -1.0% usually means declining growth.

The next summary is scheduled for release on MINES FaxBack at 10:00 a.m. EST, Friday, December 17. Access MINES FaxBack from a touch-tone telephone attached to a fax machine by dialing 703-648-4999. The address for *Metal Industry Indicators* on the World Wide Web is: <http://minerals.usgs.gov/minerals/pubs/mii/>

The *Metal Industry Indicators* is produced at the U.S. Geological Survey by the Minerals Information Team. The report is prepared by Kenneth Beckman (703-648-4916), e-mail (kbeckman@usgs.gov), and Gail James (703-648-4915), e-mail (gjames@usgs.gov). The Center for International Business Cycle Research, under the direction of Dr. Geoffrey H. Moore, and the former U.S. Bureau of Mines developed the metal industry leading and coincident indexes in the early 1990's. Customers can send mail concerning the *Metal Industry Indicators* to the following address:

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